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ABSTRACT

Designed for students in grades 4-6, the teaching unit presents illustrations and facts about snakes. Topics include common snakes found in the United States, how snakes eat, how snakes shed their skin, poisonous snakes, the Eastern Indigo snake, and the anatomy of a snake. A student page includes a crossword puzzle and surprising snake facts. A teacher page provides background information, instructions for preparing a snake habitat, and tips on caring for garter snakes. In the final section, references and an answer key are provided. (LH)

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Nature Naturally

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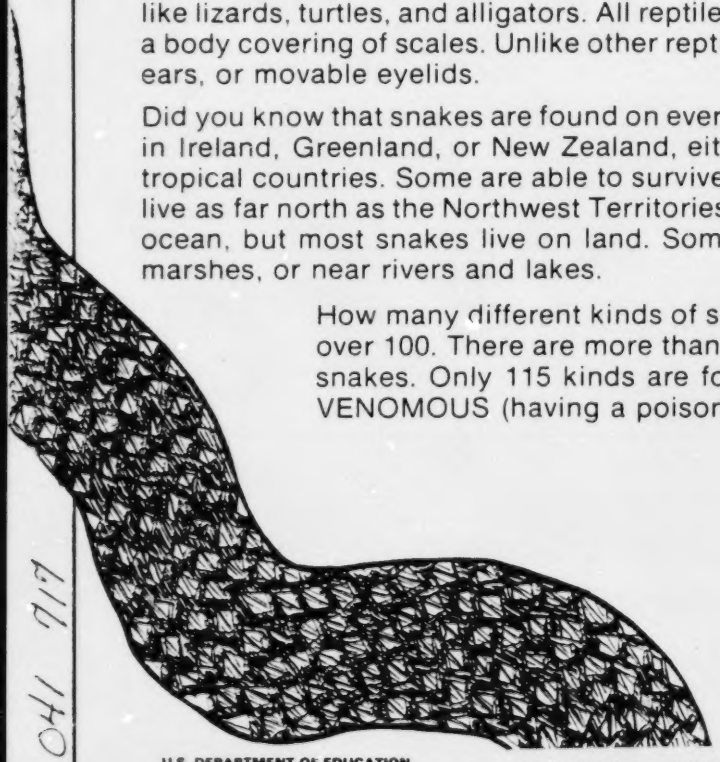
SNAKES! SNAKES! SNAKES!

Snakes! Have you ever wondered about these unusual animals? Snakes are reptiles, just like lizards, turtles, and alligators. All reptiles, including snakes, are cold-blooded and have a body covering of scales. Unlike other reptiles, however, snakes do not have legs, external ears, or movable eyelids.

Did you know that snakes are found on every continent except Antarctica? None are found in Ireland, Greenland, or New Zealand, either. Snakes are especially abundant in warm, tropical countries. Some are able to survive in the heat of the hot, dry desert, while others live as far north as the Northwest Territories of Canada. Sea snakes spend their lives in the ocean, but most snakes live on land. Some prefer the forest, while others live in fields, marshes, or near rivers and lakes.

How many different kinds of snakes do you think live on the earth? There are over 100. There are more than 1,000! There are about 2,700 different kinds of snakes. Only 115 kinds are found in the United States, and 17 of them are VENOMOUS (having a poisonous bite).

People have always been fascinated by and sometimes afraid of snakes. After all, snakes don't look like many other animals and they move in such unusual ways. To find out more about these exciting animals, just turn the page.



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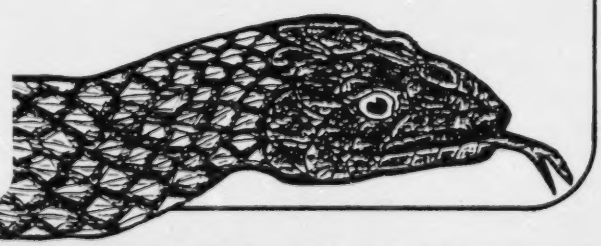


Common Snakes

Over a dozen kinds of nonvenomous WATER SNAKES may live in and around ponds, rivers, and lakes of the United States. Often they are confused with the venomous COTTONMOUTH. Like the cottonmouth, water snakes have wide, flat heads and stout bodies. Some have brightly colored patterns of red or yellow on their backs, while others are dull brown or black. When alarmed, a water snake flattens its body and strikes, delivering a hard, painful bite. If captured, a water snake emits a foul-smelling liquid. Water snakes are good swimmers and can dive underwater to catch their PREY (animals eaten as food) of frogs, fish, crayfish, and salamanders.

KING SNAKES, sometimes called swamp wampers or thunder snakes, are shiny, black snakes with white or yellow spots or stripes. When disturbed in the wild, these snakes may hiss, vibrate their tails in dried leaves to sound like a rattlesnake, and strike. However, most king snakes become quite tame when captured and often make nice pets. They are immune to the venom of the native venomous snakes, so people are happy to have king snakes living near their homes! These snakes eat lizards, rodents, and other kinds of snakes, including rattlesnakes.

RAT SNAKES are large, handsome snakes which may grow to be 6 or 7 feet long. Some rat snakes are black or gray with white or yellow spots or stripes. Others are patterned with orange, red, and copper-brown markings. Like the king snake, they vibrate their tails and hiss when alarmed. These snakes can climb trees and rock ledges in search of food. Rat snakes often make their homes around barns and other farm buildings where they catch rats and mice.

The HOGNOSE SNAKE has an upturned nose used for burrowing. If you find a hognose in the woods, you may discover why this snake is also called a puff adder. The hognose tries to scare its enemies by flattening its head and neck, inflating its body with air, and hissing loudly. The snake may also strike with its mouth closed. If this does not work, the hognose may roll over on its back, make a few convulsive movements, and play dead. If you turn the snake back on its belly, it will roll over again. All of this is just a bluff to frighten away enemies!

HOW SNAKES EAT

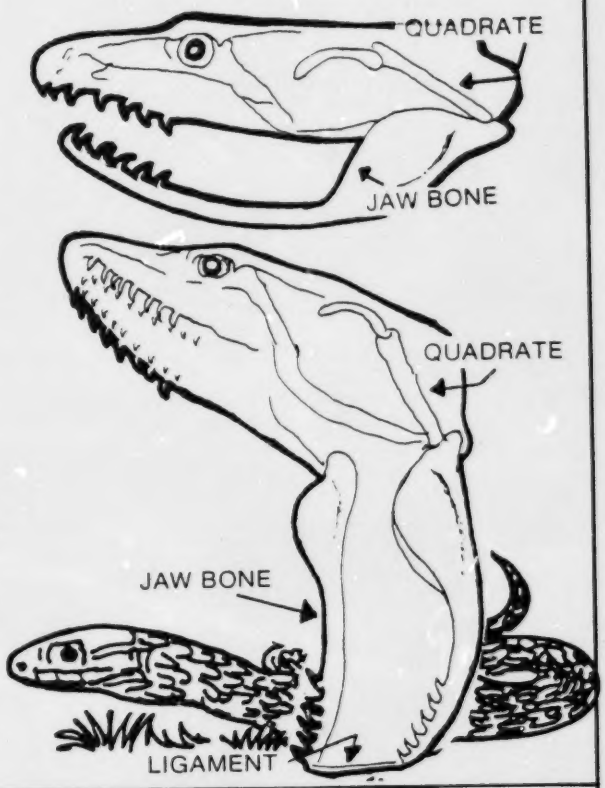
Snakes eat in an amazing way! Instead of taking a bite of food and chewing it like most animals, snakes swallow their prey whole. They have special jaws that open very widely. This allows them to swallow a meal in one big gulp.

A snake's jaw isn't attached directly to the skull like your jaw is. Instead, a snake's jawbones are attached to long movable bones, called QUADRATES, found on either side of the skull. The quadrate bones swing down and out when the snake opens its mouth to eat. This allows the jaw bones to open widely in the back of the mouth as well as in the front.

Snakes can stretch their jaws open sideways, too. The lower jaw is really two separate bones connected by a LIGAMENT (tissue that connects bones) that stretches sideways like a rubberband. A snake can open its jaw 2 or 3 times wider when eating than when resting.

Snakes have short, pointed teeth which help hold the food as they swallow. To swallow a meal, a snake moves one jaw forward, then the other. The jaws appear to "walk" the meal into the mouth. Once the food has moved to the back of the mouth, the throat muscles carry it down to the stomach for digestion.

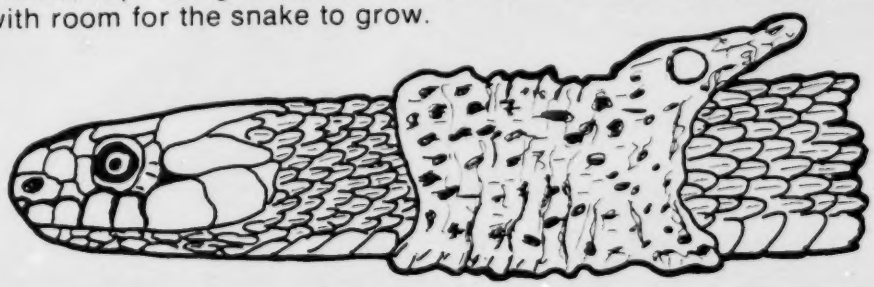
It may take over an hour for some snakes to swallow a meal. During this time, food is blocking the snake's mouth and throat. Special muscles push the end of the snake's windpipe, the glottis, under the food to the front of the mouth, so the snake can breath while swallowing.



HOW A SNAKE SHEDS ITS SKIN

Imagine shedding your skin every few months as you grow taller! That would be very unusual for a person, but it's natural for a snake. As your body grows, your skin grows, too. However, a snake's skin does not grow like yours does. Instead, its skin gets tighter and tighter as the snake grows larger. A new layer of skin is formed under the old, tight skin. When the old skin is too tight, it is shed all in one piece! Young snakes may grow very rapidly and shed their skins many times in a year. Adults may shed only 2 or 3 times a year.

About a week before shedding, a snake's skin turns milky in color and the SPECTACLE, a clear scale covering the eye, becomes cloudy. The snake cannot see well and will seek a quiet place to await the shedding. A day or so before the snake sheds, the spectacle clears and the snake becomes active again. When the skin is ready to peel, it first separates at the mouth and then starts to turn inside-out as the snake crawls forward. Usually, the snake is eager to lose the outer skin and will rub against rocks or rough surfaces to help remove it. The process of shedding may take a very short time or last several hours, depending on how active the snake is while shedding. The new skin is bright and shiny with room for the snake to grow.



VENOMOUS SNAKES

Many people use the expression **poisonous snake.** Did you know that the snake itself is not poisonous? Instead, it is the VENOM (a thick, yellowish fluid) which the snake produces that is poisonous to many animals. The correct term for a poisonous snake is VENOMOUS SNAKE.

Most snakes that you may encounter are nonvenomous. There are only four main kinds of venomous snakes in the Southeastern United States. These are the pit vipers, including COPPERHEADS, COTTONMOUTHS, and RATTLESNAKES, and the EASTERN CORAL SNAKE.

Learn to recognize venomous snakes and avoid getting close to them. If one is found in the wild, do not panic! Slowly back away from the area. The snake will first try to hide or move away from you. If it is still threatened, the snake will get into a position ready to defend itself. Remember that a snake can only strike a distance of one-third to one-half the length of its body.

How can you know if a snake is venomous or nonvenomous? All PIT VIPERS have stout bodies and large, triangular-shaped heads. Special heat-sensitive pits, or holes, are located on either side of the head between the eye and the nostril. These are used for hunting warm-blooded prey in the darkness of night. Their eyes have vertical pupils, like cats' eyes, which help them to see more clearly at night. Pit vipers also have a pair of hollow fangs near the front of the upper jaw which are shed and replaced every six to eight weeks. Glands behind the fangs produce the poisonous venom used to paralyze the snake's prey. The snake can even regulate the amount of venom injected with each bite!

Although a snake bite can be very painful and cause serious injury, few people (less than 15) die of snake venom poisoning in the United States each year. To avoid snake bite, never place your hands or feet into hidden areas and never handle venomous snakes. If you are bitten by a venomous snake, stay calm and get to a medical facility quickly. Do not use the old cutting and suction method of treatment, for this causes more harm than good. Also, do not pack the injury with ice. Remember that if you keep your eyes open for snakes and leave them alone, they will not harm you!

RATTLESNAKES of the southeast include the EASTERN DIAMONDBACK (the most dangerous snake in Eastern North America), the TIMBER RATTLESNAKE, and the PIGMY RATTLESNAKE. The rattle on the tail is made of dry, horny segments. A young rattlesnake bears only one segment, called a button. A new segment is added each time the snake sheds its skin, which may be several times a year. Therefore, you cannot tell the snake's age by the number of rattles! Rattlesnakes vibrate their tails very rapidly when threatened, a behavior which nonvenomous snakes may imitate. Dark, blotched crossbands or diamond markings camouflage the rattlesnake as it lies in wait for prey. Mainly NOCTURNAL (active at night), they prey on small mammals and birds.

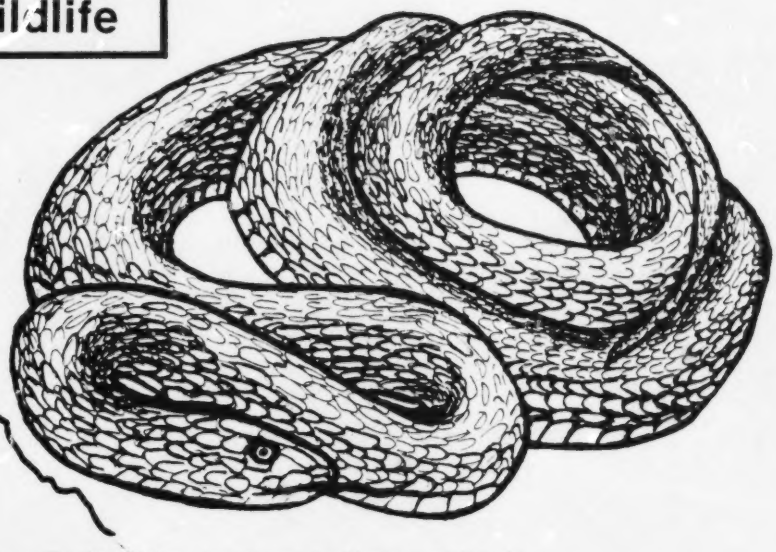
The **NORTHERN** and **SOUTHERN COPPERHEADS** are copper, orange, or pink with broad, darker crossbands resembling an hourglass pattern. These snakes are nocturnal, feeding on small rodents, lizards, frogs, and some insects. Copperheads are the least dangerous of our venomous snakes.

EASTERN and **FLORIDA COTTONMOUTHS** are the only venomous water snakes in the Southeast. They are dark and heavy-bodied with many variations in markings. Unlike other water snakes, they lift their flat-topped heads high above water while swimming. When threatened, the cottonmouth may open its mouth, revealing the light, "cotton" lining inside. The cottonmouth's bite is more serious than that of the copperhead.

The **CORAL SNAKE,** found in southern Georgia and Florida, lacks the pits, vertical pupils, and triangular head of the pit vipers. It is recognized by the pattern of bright, colorful bands or red, yellow, and black encircling its body. Several nonvenomous snakes look very similar to the coral snake, but they have black bands between the red and yellow ones. If the red and yellow bands touch, the snake is venomous. Just remember the saying "Red and yellow, dangerous fellow; red and black, friend of Jack."

Georgia's Protected Wildlife

THE EASTERN INDIGO SNAKE



Do you know the name of the largest snake in North America? It is the nonvenomous INDIGO SNAKE (Drymarchon corais) which can grow to over eight feet in length! The eastern indigo snake ranges from southeastern Georgia through Florida. A western form, the Texas indigo snake, lives in southern Texas and Mexico.

A stout-bodied, shiny, blue-black snake, the eastern indigo has a reddish tint on the chin, throat, and sides of the head. Gopher snake is another name earned by this reptile, since it is often found living in gopher tortoise burrows, along with other reptiles and small mammals.

Eastern indigo snakes mate from November to February. Being OVIPAROUS, or egg-laying, the female lays 5 to 12 elongated, leathery eggs, each 3 to 4 inches long. The young snakes hatch from late July to October and are 19 to 26 inches long.

Eastern indigo snakes live in the sandy coastal plain areas where pines, turkey oaks, and palmettos grow. Their favorite foods are frogs, small mammals, birds, and other reptiles, including the venomous rattlesnake and cottonmouth! Not a constrictor, the indigo snake seizes its prey with powerful jaws.

Sadly, the eastern indigo snake is disappearing from the wild. Since these animals tame easily as pets, many have been captured and sold in the pet trade. Also, much of their habitat has been destroyed by land development projects.

For these reasons, the eastern indigo snake is now listed as a Threatened Species under Georgia's Endangered Wildlife Act of 1973. This law makes it illegal to possess, transport, sell, trade, or kill any animal placed on the Protected Wildlife List. It also provides help in the form of research, habitat preservation, and public education. In addition, Georgia's nongame wildlife laws protect **all** nonvenomous snakes in the state from being harmed in any way. **You** can help by telling your friends about the indigo snake and other protected wildlife species.

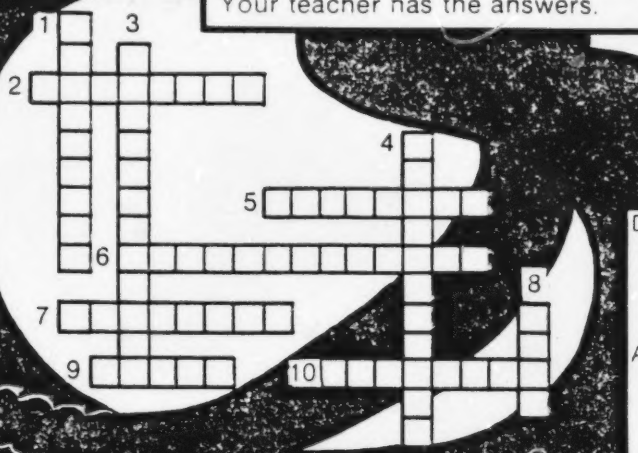
For further information, contact:

Georgia Department of
Natural Resources
Game and Fish Division
Endangered Wildlife Program
Route 2
Social Circle, GA 30279

Save Endangered Species
P.O. Box 50771
Washington, DC 20004

Puzzling Snake

See how many of the blanks you can fill in for the crossword puzzle. All of the words are used somewhere in this **Nature Naturally.** Your teacher has the answers.



DOWN
1. clear scale covering a snake's eye.
3. snake mouthpart used for smelling.
4. body temperature similar to the surroundings.
8. an animal eaten as food.

ACROSS
2. an animal with a venom-producing gland.
5. a group of cold-blooded animals which includes snakes and turtles.
6. a fear of snakes.
7. a strong tissue that holds bones together.
9. a thick, yellowish, poisonous fluid.
10. special bone that allows snake jaw to expand.

SNAKE FACT AND FICTION

FACT

1. Snake skin is dry and clean, not slimy.
2. The forked tongue of a snake is used as a sensory organ and enhances its sense of smell. A snake cannot sting with its tongue.
3. Most snakes cannot dig underground holes. Instead, they use the abandoned burrows of other animals.
4. The average person can easily outrun a snake.
5. Snakes do not have external ears and cannot hear. They feel vibrations instead.

FICTION

1. A snake can make another animal stand still just by staring at it.
2. Snakes don't die until sundown, even if killed early in the day.
3. The milk snake, which lives around barns, drinks milk from a cow.
4. Hoop snakes can put their tails into their mouths and roll like hoops.

Can you add other examples to SNAKE FACT AND FICTION?

FAR OUT FACTS

- The fear of snakes is called OPHIDIAPHOBIA.
- The giant anaconda is the world's heaviest snake. One 19-foot specimen measured 3 feet around and weighed 236 pounds!
- The reticulated python is the longest snake in the world with a record length of 33 feet!

This is a publication of the Education Department of the Ida Cason Callaway Foundation, the non-profit educational, religious, and charitable organization which owns and operates Callaway Gardens. It is published three times a year for school children, grades 4-6, in Georgia and Alabama. The purpose of the newsletter is to enhance children's appreciation of ecology and conservation.

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Teacher's Page

GARTER SNAKES AS PETS

Snakes are interesting and unusual animals to keep as pets. The garter snake, **Thamnophis sirtalis**, one of the most common snakes, is harmless to man and easy to tame.

Found in a variety of habitats, garter snakes prefer areas close to water. They are often seen around lakes and ponds because their diet consists mainly of frogs, toads, and small fish. They also feed on earthworms, insects, and mice.

The prominent identifying characteristics of garter snakes are the three light-colored stripes running the length of the body. The stripes may be a cream, yellow, or green against a darker background of black, brown, or olive. The average length at maturity is three feet, and females are usually slightly larger than males.

When captured or injured, a garter snake secretes a fluid with an offensive odor as a defense mechanism. This behavior usually ceases as the snake becomes accustomed to being handled. Avoid making quick movements or sudden sounds around any pet snake, because if frightened, it may strike.

An aquarium with a screen cover is frequently used for a snake cage. The cage should be well ventilated and provide adequate room. If possible, position the cage so that part of it is in the sunlight. Snakes need warmth, but too much can kill them, so provide them with shade, also.

Pine needles or newspaper are good bedding materials for the cage because they do not retain moisture. Change the bedding material regularly to prevent infections from parasites such as mites. Snakes need rocks and branches to climb on and hide under. Add a large water dish to the cage. Non-aquatic snakes need to soak in water before shedding their skin. Don't leave any edges or surfaces of the cage unfinished, because snakes can easily damage their skin and get infections.

Snakes can be fed every one to four weeks depending on their size and the amount eaten. Snakes eat their prey alive, so if your snake won't eat, mix a few earthworms with chopped meat such as raw beef, liver, or fish. Place these in a shallow or flat dish and the snake will be attracted by the scent and wiggling of the worms. Eventually, they may eat chopped, raw meat alone. You may want to mix a little cod liver oil or the partial contents of a vitamin capsule into the food occasionally.

If your snake appears ill or has visible signs of infection, you can try to treat it or release the snake and find another one. Several books are available on wild animal care or ask for advice from a veterinarian familiar with snakes.

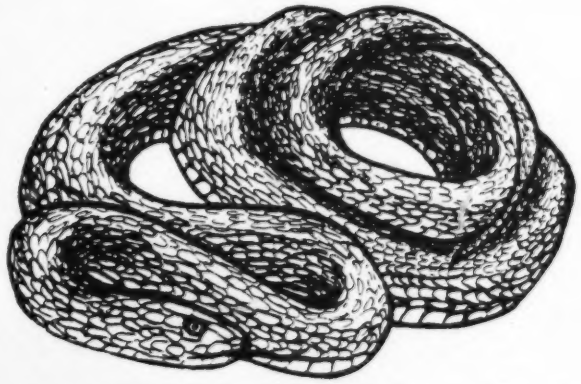
Snakes have personalities just like other pets. Once your snake has been tamed, think of it as you would any other pet and take good care of it!

ANATOMY OF A SNAKE

The internal organs of a snake are modified to fit into a long, tubular body cavity. Because there is not room for the paired arrangement typical of organs found in most vertebrates, the organs of a snake are generally found one behind the other or are missing entirely. In the case of paired organs, the right organ is usually larger than, and in front of, the left one and both are elongated. This arrangement is true of the kidneys, ovaries, testes, and lungs. Although the left lung is generally reduced and nonfunctional, the right lung normally extends half of the body length! The liver is elongated with a larger right lobe, and the urinary bladder has been completely eliminated. There is no need for long, highly-coiled intestines. The alimentary canal of snakes is not coiled and the stomach is no more than an expanded portion of the canal.

A snake has no limbs, and no hip or shoulder girdles. The skeletal system is adapted to a long, narrow body. The number of vertebrae in snakes varies from just under two hundred to about four hundred in some of the larger snakes such as the python.

Each vertebra is interlocked with the next in a ball-and-socket fashion. The bony prongs of each vertebra touch the prongs of adjacent vertebrae, which makes the vertebral column strong and flexible. The joints are highly flexible horizontally, but can move only a few degrees vertically.



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*Answers to Puzzling Snakes